

**IN THE CLAIMS:**

Claims 1-7 and 9-56 are cancelled, and new claims 57-93 are added. No new matter is believed to be introduced by such new claims.

1. - 7. **(Cancelled)**

8. **(Previously submitted)** In an x-ray tube comprising a vacuum enclosure having disposed therein a target anode with a target surface, an integral cathode disposed in the vacuum enclosure and being spaced apart from the target surface of the target anode, the integral cathode comprising:

- (a) an emitter capable of discharging electrons, said emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to be directed at the target surface of the target anode and converge at a focal spot, wherein said predetermined geometrical configuration provides an emitter having a cross-section substantially in the shape of an arc so that a concave side of said emitter is directed towards the target surface of the anode; and
- (b) a support cartridge, said support cartridge providing structural support for said emitter.

9. - 56. **(Cancelled)**

57. (New) The integral cathode as recited in claim 8, wherein the emitter is substantially confined within the support cartridge.

58. (New) The integral cathode as recited in claim 8, wherein the emitter defines at least one cutout.

59. (New) The integral cathode as recited in claim 8, wherein the arc shape of the emitter comprises one of: a substantially parabolic arc; and, a substantially circular arc.

60. (New) The integral cathode as recited in claim 8, wherein the emitter substantially comprises a single piece of material.

61. (New) The integral cathode as recited in claim 8, wherein the emitter substantially comprises a refractory metal.

62. (New) The integral cathode as recited in claim 8, wherein the emitter is doped with a dopant.

63. (New) The integral cathode as recited in claim 8, wherein the emitter comprises a plurality of subsidiary emitting portions.

64. (New) The integral cathode as recited in claim 8, wherein the support cartridge serves to substantially maintain the emitter in the arc shape.

65. (New) The integral cathode as recited in claim 8, wherein the support cartridge substantially comprises one of: a ceramic material; and, cataphoretically coated iron.

66. (New) The integral cathode as recited in claim 8, wherein the support cartridge comprises:

an electrically conductive portion; and  
a non-electrically conductive portion.

67. (New) An integral cathode, comprising:

an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point; and

a support cartridge within which the emitter is at least partially received.

68. (New) The integral cathode as recited in claim 67, wherein the emissive surface substantially comprises a single piece of material.

69. (New) The integral cathode as recited in claim 67, wherein the emitter is substantially confined within the support cartridge.

70. (New) The integral cathode as recited in claim 67, wherein the emitter defines at least one cutout.

71. (New) The integral cathode as recited in claim 67, wherein the emissive surface is substantially concave in shape.

72. (New) The integral cathode as recited in claim 71, wherein the substantially concave shape comprises one of: a substantially parabolic arc; and, a substantially circular arc.

73. (New) The integral cathode as recited in claim 67, wherein the emitter substantially comprises a refractory metal.

74. (New) The integral cathode as recited in claim 67, wherein the emitter is doped with a dopant.

75. (New) The integral cathode as recited in claim 67, wherein the support cartridge serves to substantially maintain the emitter in the shape.

76. (New) The integral cathode as recited in claim 67, wherein the support cartridge substantially comprises one of: a ceramic material; and, cataphoretically coated iron.

77. (New) The integral cathode as recited in claim 67, wherein the support cartridge comprises at least one of:

an electrically conductive portion; and

a non-electrically conductive portion.

78. (New) An integral cathode, comprising:  
an emitter substantially comprising a substantially concave emissive surface configured to be oriented toward a target surface of a target anode; and  
a support cartridge within which the emitter is at least partially received.
79. (New) The integral cathode as recited in claim 78, wherein the substantially concave shape comprises one of: a substantially parabolic arc; and, a substantially circular arc.
80. (New) The integral cathode as recited in claim 78, wherein the emissive surface substantially comprises a single piece of material.
81. (New) The integral cathode as recited in claim 78, wherein the emitter substantially comprises a refractory metal.
82. (New) The integral cathode as recited in claim 78, wherein the emitter defines at least one cutout.
83. (New) The integral cathode as recited in claim 78, wherein the support cartridge comprises:  
an electrically conductive portion; and  
a non-electrically conductive portion.

84. (New) An x-ray device, comprising:

a vacuum enclosure within which a target anode having a target surface is substantially disposed; and

an integral cathode substantially disposed within the vacuum enclosure and comprising:

an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point proximate the target surface; and

a support cartridge within which the emitter is at least partially received.

85. (New) The x-ray device as recited in claim 84, wherein the target anode comprises a rotating-type target anode.

86. (New) The x-ray device as recited in claim 84, wherein the emissive surface of the emitter substantially comprises a single piece of material.

87. (New) The x-ray device as recited in claim 84, wherein the emitter defines at least one cutout.

88. (New) The x-ray device as recited in claim 84, wherein the emissive surface is substantially concave in shape.

89. (New) The x-ray device as recited in claim 88, wherein the substantially concave shape comprises one of: a substantially parabolic arc; and, a substantially circular arc.

90. (New) The x-ray device as recited in claim 84, wherein the emitter substantially comprises a refractory metal.

91. (New) The x-ray device as recited in claim 84, wherein the emitter is doped with a dopant.

92. (New) The x-ray device as recited in claim 84, wherein the support cartridge substantially comprises one of: a ceramic material; and, cataphoretically coated iron.

93. (New) The x-ray device as recited in claim 84, wherein the support cartridge comprises at least one of:

an electrically conductive portion; and

a non-electrically conductive portion.

## **RESPONSE**

This paper is presented in response to the Examiner's Office Action mailed February 9, 2004 (the "Office Action"). Claims 1-7 and 9-56 are cancelled, and new claims 57-93 are added. Claims 8 and 57-93 are now pending in this application as a result of such cancellations and new claims.

Reconsideration of this application is respectfully requested in view of the amendment herein and the following remarks. For the convenience and reference of the Examiner, the remarks of the Applicant are presented in the order in which the corresponding issues were raised in the Office Action.

In connection with the matters contemplated herein, Applicant respectfully notes at the outset that the following discussion should not be construed to constitute an exhaustive enumeration of the distinctions between the claims of the present application and the references cited by the Examiner. Instead, such distinctions are presented solely by way of example. Consistent with the foregoing, the discussion herein is not intended, and should not be construed, to prejudice or foreclose future consideration, by the Applicant, of additional or alternative distinctions between the claims of the present application and the references cited by the Examiner.

### **I. Claim Rejections**

The Examiner has rejected claims 1-3, 5-7, 11-16, 18, 28-39, and 41-56 under 35 U.S.C. § 102(b) as anticipated by U.S. 5,264,801 issued to DeCou Jr. et al. ("*DeCou*"). Applicant respectfully disagrees with the Examiner but submits that in light of the cancellation herein of



claims 1-3, 5-7, 11-16, 18, 28-39, and 41-56, the rejection is moot and should accordingly be withdrawn.

In addition, the Examiner has rejected claims 4, 9, 10, 17, 19-22, and 40 under 35 U.S.C. § 103(a) as unpatentable over various combinations of references including *DeCou*. Applicant respectfully disagrees with the Examiner but submits that in light of the cancellation herein of claims 4, 9, 10, 17, 19-22, and 40, the rejection is moot and should accordingly be withdrawn.

## **II. Allowable Subject Matter**

Applicant gratefully acknowledges the allowance of claim 8. As new claims 57-66 depend from claim 8, Applicant respectfully submits that those claims are in condition for immediate allowance.

## **III. New Claims 67-93**

By this amendment, Applicant has added new independent claims 67, 78 and 84. For at least the reasons outlined below, Applicant respectfully submits that each of those independent claims, as well as their corresponding dependent claims, is in condition for allowance.

For example, new claims 67 and 84 require, among other things, “an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point.” Further, new claim 78 requires, among other things, “an emitter substantially comprising a substantially concave emissive surface configured to be oriented toward a target surface of a target anode.”

However, the Examiner has not established that any of the references of record teaches or suggests the combinations recited in the new claims submitted herein. Applicant accordingly submits that new claims 67-93 are neither anticipated nor made obvious by the cited references, regardless of whether such cited references are considered singly or in combination with each other.

With respect to the aforementioned exemplary limitations of new independent claims 67, 78 and 84, Applicant respectfully notes that reference to such limitations is not intended, nor should it be construed, to be either an admission or assertion by the Applicant that patentability of Applicant's new claims, or any other claims, hinges on the presence of such limitations. Rather, Applicant submits that each of the now pending claims, considered in its respective entirety, patentably distinguishes over the references cited by the Examiner.

Finally, Applicant respectfully notes that the new claims herein have been added to clarify the claimed invention from elements purported by the Examiner to be disclosed by the cited prior art. The addition of such new claims should not, however, be construed as an acquiescence on the part of the Applicant as to the purported teachings or prior art status of the cited art, nor as to the characterization of the cited art advanced by the Examiner. Accordingly, Applicant reserves the right to challenge the purported teachings and prior art status of the cited references at any appropriate time.

### CONCLUSION

In view of the remarks and amendment submitted herein, Applicant respectfully submits that each of the pending claims 57-93 is in condition for allowance. Therefore, reconsideration of the rejections is requested and allowance of those claims is respectfully solicited. In the event that the Examiner finds any remaining impediment to a prompt allowance of this application that could be clarified in a telephonic interview, the Examiner is respectfully requested to initiate the same with the undersigned attorney.

Dated this 9<sup>th</sup> day of <sup>July</sup>~~June~~, 2004.

Respectfully submitted,



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